REMARKS

Applicant has amended the description to correct typographical errors, to properly reflect the status of the U.S. Patent Application cited therein, and to amend the abstract in accordance with the Examiner's suggestion.

The sections below are numbered to correspond with the section numbering used by the Examiner in the Office Action.

1/2) The disclosure has been corrected.

The abstract has been amended in accordance with the Examiner's suggestion. Further, the application information at page 14, lines 12-14 has been updated.

For the above reasons, Applicant respectfully requests reconsideration and withdrawal of this objection.

3) Claims 12-21 and 29-38 are patentable over Posa.

A) CLAIMS 12-21, 35-38 ARE PATENTABLE OVER POSA.

The Examiner states:

> ... Posa discloses a method and apparatus for depositing a material on a substrate using a chemical vapor deposition process. The apparatus contains **a reaction chamber 16 and a vent chamber 18** which comprises a gas source 20 which injects a flow into **a manifold 22** (col.4 lines 33-55). **An inlet valve 26 is utilized** (lines 56-60). Posa also teaches the use of more than one source and more than one valve (paragraph bridging cols.4-5). The gases can empty into **an exhaust 40** (col.5 lines 19-20). (Office Action, page 3, emphasis added.)

Accordingly, the Examiner asserts "a manifold 22" and that "An inlet valve 26 is utilized". However, the Examiner has failed to callout where Posa teaches that the inlet valve 26 is coupled **between** a first regulator and the manifold 22.

Specifically, Posa teaches:

> ... As indicated schematically in FIG. 1, the valve 26 switches the nonreactive gas flow from source 24 into one of the chambers 16, 18 while simultaneously

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> switching the reactive gas flow from source 20 into the other of the chambers. … Any number of **valves 26** with associated gas sources 20, 24 can be installed **within the manifold 22**, a single valve 26 shown in FIG. 1 only for purposes of illustration. (col. 4, line 60 to col. 5, line 5, emphasis added.)

Accordingly, Posa teaches that the valves 26 are installed **within** the manifold 22. Thus, the Examiner has failed to callout where Posa teaches or suggests a method comprising:

> opening a first gas manifold inlet valve **coupled between a first regulator and a gas manifold**;
> regulating a flow rate of a flow of a first process gas **through said first gas manifold inlet valve to said gas manifold** with said first regulator;
> opening a second gas manifold inlet valve **coupled between a second regulator and said gas manifold**; and
> regulating a flow rate of a flow of a second process gas **through said second gas manifold inlet valve to said gas manifold** with said second regulator, wherein said first process gas and said second process gas mix in said gas manifold,

as recited in Claim 12, emphasis added. For at least the above reasons, Claim 12 is allowable over Posa. Claims 13-20, which depend from Claim 12, are allowable for at least the same reasons as Claim 12.

Claims 21, 35, 36, and 38 are allowable over Posa for reasons similar to Claim 12. Claim 37, which depends from Claim 36, is allowable for at least the same reasons as Claim 36.

Further, since Posa teaches that the valves 26 are installed **within** the manifold 22, Applicant respectfully submits that the Examiner has failed to callout where Posa teaches redirecting gas from an exhaust to the gas manifold.

Specifically, with regards to the exhaust, the Examiner states:

> … The gases can empty into an exhaust 40 (col.5 lines 19-20). (Office Action, page 3.)

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However, at the Examiner cited section of col. 5, lines 19-20, Posa teaches:

> The pump 36 evacuates **the chamber gases** to an exhaust 40. (Emphasis added.)

As shown in FIG. 1 of Posa, the gases **pass through the manifold 22** before reaching the chambers and eventually passing to the exhaust 40. Specifically, Posa teaches:

> The deposited materials … are carried as reactive gases from a plurality of gas sources such as **a source 20** that injects a gas flow **into the body 12 through a manifold 22**. A second, nonreactive gas represented by a **source 24** also injects a gas flow **into the body 12 through the manifold 22**. … (Col. 4, lines 44-50, emphasis added.)

Since Posa teaches that the gases pass through the manifold 22 to reach the exhaust 40, the Examiner has failed to callout where Posa teaches or suggests a method comprising:

> opening a first gas manifold inlet valve coupled between a first regulator and a gas manifold;
> regulating a flow rate of a flow of a first process gas through said first gas manifold inlet valve to said gas manifold with said first regulator;
> opening a second gas manifold inlet valve coupled between a second regulator and said gas manifold;
> regulating a flow rate of a flow of a second process gas through said second gas manifold inlet valve to said gas manifold with said second regulator;
> opening a gas manifold exhaust valve coupled between a third regulator and an exhaust;
> **regulating a flow rate of a flow of a third process gas through said gas manifold exhaust valve to said exhaust** with said third regulator during said regulating a flow rate of a flow of a first process gas and said regulating a flow rate of a flow of a second process gas;
> closing said first gas manifold inlet valve and said second gas manifold inlet valve to stop said flow of said first process gas and said flow of said second process gas to said gas manifold; and
> **redirecting said flow of said third process gas from said exhaust to said gas manifold,**

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as recited in Claim 36, emphasis added. For at least this additional reason, Claim 36 is allowable over Posa. Claim 37, which depends from Claim 36, is additionally allowable over Posa for at least the same reasons as Claim 36. Claims 18, 19 and 38 are additionally allowable over Posa for reasons similar to Claim 36.

B. CLAIMS 29-34 ARE PATENTABLE OVER POSA.

The Examiner states:

> In claims 29-34, **the applicant requires setting a flow rate.** This would be inherent in the use of regulators. Hence, it is the examiner's position that the limitation reads on the cited reference. (Office Action, page 4, emphasis added.)

The Examiner's statement is respectfully traversed. Posa teaches:

> The member 112 switches the reactive gas flow between a first outlet to **a vent path 115 and vent chamber 18** and a second outlet to **a process path 116. The path 116 connects to a manifold outlet 117 to the process chamber 16.** … These reactive and nonreactive gas flows into the process chamber and vent chamber **are mutually exclusive.** (Col. 5, line 68 to col. 6, line 15, emphasis added.)

Accordingly, Posa teaches that the reactive gas is selectively directed between the process chamber and the vent chamber. However, the Examiner has failed to call out where Posa teaches that **only a portion** of the reactive gas is supplied to the process chamber 16, i.e., where Posa teaches that less than the entire flow of the reactive gas is directed to either the process chamber or the vent chamber.

For at least these reasons, the Examiner has failed to callout where Posa teaches or suggests a method comprising:

> setting a first flow rate of a flow of a first gas to a mixer;
> setting a second flow rate of a flow of a second gas to said mixer, wherein **a first flow of a gas**

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mixture comprising said first gas and said second gas exits said mixer, said first flow of said gas mixture having a third flow rate;

setting a fourth flow rate of a second flow of said gas mixture to a reactor,

as recited in Claim 29, emphasis added. Accordingly, Claim 29 is allowable over Posa. Claims 30-31, which depend from Claim 29, are allowable over Posa for at least the same reasons as Claim 29.

Claim 32 is allowable over Posa for reasons similar to Claim 29. Claims 33-34, which depend from Claim 32, are allowable over Posa for at least the same reasons as Claim 32.

For the above reasons, Applicant respectfully requests reconsideration and withdrawal of this rejection.

CONCLUSION

Claims 12-21 and 29-38 are pending in the application. For the foregoing reasons, Applicant respectfully requests allowance of all pending claims. If the Examiner has any questions relating to the above, the Examiner is respectfully requested to telephone the undersigned Attorney for Applicant(s).

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on November 6, 2002.

Attorney for Applicant(s) — November 6, 2002 Date of Signature

Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Gary M. Moore		
Assignee:	Moore Epitaxial Inc.		
Title:	METHOD OF CONTROLLING GAS FLOW TO A SEMICONDUCTOR PROCESSING REACTOR		
Serial No.:	09/765,919	Filed:	January 18, 2001
Examiner:	Chen, Bret P.	Group Art Unit:	1762
Docket No.:	MTEC101001		

Monterey, CA
November 6, 2002

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE DESCRIPTION

Change the paragraph extending from Page 4, line 29 to Page 5, line 5 as follows:

After the high dopant concentration process gas was fully removed from reactor 14, the lightly doped P type silicon layer was deposited. Valve 42 was opened and process gas A, hereinafter referred to as low dopant concentration process gas, flowed through MFC 32 through valve 42 to exhaust 23 until the mass flow rate of the flow through MFC 32 stabilized. Valve 40 was opened and valve 42 was closed thereby providing the low dopant concentration process gas into reactor 14. The low dopant concentration process gas reacted with heated substrates 16 and formed the lightly doped P type silicon layer on substrates 16.

Change the paragraph extending from Page 9, line 11 to line 24 as follows:

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Also in accordance with the present invention, a method of controlling gas flow to a reactor includes opening a first gas manifold inlet valve coupled between a first mass flow controller, e.g., a first regulator, and a gas manifold and regulating a mass flow rate of a flow of a first process gas through the first gas manifold inlet valve to the gas manifold with the first mass flow controller. The method further includes opening [an] a gas manifold exhaust valve coupled between a second mass flow controller, e.g., a second regulator, and an exhaust and regulating a mass flow rate of a flow of a second process gas through the gas manifold exhaust valve to the exhaust with the second mass flow controller.

Change the paragraph extending from Page 13, line 16 to line 23 as follows:

For example, a process gas may be supplied to point of use 501 by gas flow controller system 500 to grow a layer on a semiconductor substrate. Short process gas supply line 506 significantly reduces or even eliminates the prior art problem of creating a transition layer after gas flow controller system 500 disconnects the process gas line or lines in the plurality of process gas lines 505 providing the process gas.

Change the paragraph extending from Page 14, line 2 to line 18 as follows:

Thus, gas flow controller system 500 of this invention permits formation of abrupt transitions between layers on a substrate using prior art processing equipment without modification to the processing reactor itself or installation of new substrate processing equipment. However, in one embodiment, to enhance formation of abrupt transitions between layers on a substrate, gas flow controller system 500 of this invention is used in combination with a gas dispersion head of Moore et al., related[, co-filed] and commonly assigned U.S. Patent Application Serial No. [[Attorney Docket No. MTEC1011]] 09/399,115, now U.S. Patent No. 6,475,284, issued November 5,

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2002, entitled "GAS DISPERSION HEAD [AND METHOD]", which is herein incorporated by reference in its entirety. Since this invention eliminates the need to obtain new processing reactors, the cost of production of substrates with state of the art feature sizes is reduced.

Change the paragraph extending from Page 17, line 24 to Page 18, line 5 as follows:

As indicated above, gas flow controller system 500 is located as close as physically possible to injector ports 518 of semiconductor processing reactor 514 so as to minimize the length of process gas supply line 506. If possible, output port 568 of gas manifold 540 is connected directly to injector ports 518. The important aspect is to minimize the volume of gas in the piping, i.e., gas manifold 540 and process gas supply line 506, between gas manifold inlet valves 542, 544, 546, 548 and injector ports 518. Thus, when one or more of gas manifold inlet valves 542, 544, 546, 548 are closed, the time required to purge or evacuate gas manifold 540 and process gas supply line 506 is minimized because the volume of gas has been minimized. Consequently, there is not enough of the process gas available to [from] form a transition layer of any consequence.

In the abstract, change the paragraph extending from Page 39, line 6 to line 18 as follows:

[A gas flow controller system includes a support structure and a gas manifold and gas manifold inlet valve located at the support structure. The gas manifold is coupled to one or more injector ports of a reactor by a process gas supply line. The reactor is supported by the support structure. Since the gas manifold and the gas manifold inlet valve are also located at the support structure, the length of the gas manifold and the process gas supply line is relatively short. Due to this relatively short length, process gas within the gas manifold and the process gas supply line is removed in a relatively

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short time after the flow of process gas to the gas manifold is shut off.] A method of controlling gas flow to a semiconductor processing reactor includes opening a first gas manifold inlet valve coupled between a first regulator and a gas manifold; regulating a flow rate of a flow of a first process gas through the first gas manifold inlet valve to the gas manifold with the first regulator; opening a second gas manifold inlet valve coupled between a second regulator and the gas manifold; and regulating a flow rate of a flow of a second process gas through the second gas manifold inlet valve to the gas manifold with the second regulator. The first process gas and the second process gas mix in the gas manifold.

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on November 6, 2002.

Attorney for Applicant(s) — November 6, 2002 Date of Signature

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